Tropical Areas of Interest Discussion for August 19, 2010

Created 1600 UTC August 19, 2010

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Summary: There is no flight activity planned for any of the tri-agency aircraft today. A suitcase flight to St Croix is currently being considered for observation of PGI-31L if it begins to undergo genesis. With several pouches/vorticity centers being tracked, much remains to be determined about where flight operations for the DC-8 should be focused in the coming week. A potential investigation of PGI-27L for Friday was scrubbed last night after an 8PM EDT decision was made based on the unlikely potential for genesis with this system based on its track, forecast speed and organization. Most of the focus for genesis is on the organization of PGI-31L into a depression in the next 24-48 hours in the East Atlantic. If this system follows current model forecast trends, it could be flyable at various times by the three agencies next week, and could provide a good target for a GRIP intensity study.

Forecast for 1600 UTC 8/19/2010:

Synoptic Overview:

In the Caribbean, there are two upper level lows, one near the Antilles in the northern Caribbean, and another that has been influencing the PGI-27L pouch as it moves along with it but to its north (**3A, 3B**). These upper level features are influencing most of the waves in the Caribbean, as well as inhibiting convection in the central Gulf (**2A, 2B**). The subtropical high is moving closer to the Bahamas, suppressing convection in the nearby areas (**1**). There is a front approaching the Gulf coast from the US, and bringing scattered showers and thunderstorms to the Gulf Coast states. PGI-27L is associated with an amplified wave and a lot of convection, but without any indication of a closed circulation. The wave is located from 9N/82W to 22N/84W (**1**). The vorticity maximum with PGI-27L at 850 hPa is located to the south of the pouch as well (**3C**), but the system is forecast to move on land in the Yucatan by this evening, 0000 UTC Aug 20, emerging back into the Gulf of Mexico tomorrow (**7**). Other features include the advancing dust into the Caribbean associated with a SAL outbreak, with a dry central Atlantic behind it (**6**), as well as an intense upper level cold low with a very impressive circulation at upper levels to the northeast of the Windward Islands (**3A, 3B**).

There are three pouches and two tropical waves in the East Atlantic (**4**). The tropical waves are analyzed from 10N/41W to 25N/41W and from 11N/33W to 23N/33W (**1**). The overall area has a lot of low level vorticity present and is a favorable area for the pouches. Over Africa, the ridge is becoming more typical and the steering flow is becoming more zonal. Deep layer steering is pushing PGI-30L off to the west-southwest, and it is not being negatively affected by shear. This system is still associated with a region of high TPW, but the system does not have much associated convection. PGI-33L and PGI-31L are forecast by some models to combine, but PGI-31L is beginning to develop a defined cyclonic flow near the surface, which was captured by an ASCAT pass this morning (**10**). Many models see PGI-31L being the dominant system and that PGI-33L eventually combines with it. These systems bear watching as genesis is definitely possible within 24-48 hours (**11**). If flight operations are to be considered for this system several

days out, most of the models forecast a track curvature to the north well before the Caribbean, which would make flight ferries fairly long for any agency.

Features of Interest:

Dust/SAL:
As of 1200 UTC on 8/19, the SAL outbreak of the past week is well established in the Caribbean. TPW imagery indicates the location of the SAL across the Atlantic well (**6**). Aqua overpasses indicate aerosol optical thicknesses of about 0.8 near the northern islands of the Caribbean, or just northeast of the British Virgin Islands (**5**). The SAL outbreak continues to be steered by a ridge in the low-level flow which is producing northeasterly winds co-located with the highest AOT values. The GEOS-5 forecasts the dust-laden air to move further west-southwest influenced by the large upper level low in the northern Caribbean. Subsidence has been strong within the SAL layer, and as the dusty air has dissipated from maximum AOTs near 1.3 to near 0.9 it has also been sinking. Maximum dust loading continues to be between the surface and 850 hPa.

PGI-27L
PGI-27L is located near 83.8W/18.9N (**1, 4**). Convection is very much widespread all the way from the Caribbean Sea to the southern Gulf of Mexico (**2A, 2B**). An upper-level trough is initiating convection just north of the Yucatan, while the wave/relative vorticity maximum near PGI-27L has initiated convection in the Caribbean Sea north-south along 83W (**3C**). The vertical wind shear over the pouch is mostly westerly shear at 10-20 kt. Likewise, widespread convection has initiated near Panama associated with a mid-level trough. The strongest relative vorticity associated with the wave (82W) is found at 700 hPa with vertically stacked weaker vorticity below and above. The satellite imagery does not clearly indicate closed rotation associated with the wave/pouch; rather just weak curvature. The main steering flow is impacted by the persistent ridge in the southern U.S. and Gulf; the forecast generally has the steering flow for PGI-27L to be more northwest (**7**).

A comparison of pouch forecast locations for yesterday's 18/12UTC initialization consensus vs. today's 19/1200UTC consensus is summarized: (18^{th}) 19/12UTC: 83.9W/17.5N
(19^{th}) 19/14UTC: 83.8W/18.9N
(18^{th}) 20/00UTC: 86.0W/18.1N
(19^{th}) 20/02UTC: 87.4W/20.1N
(18^{th}) 20/12UTC: 88.4W/18.7N
(19^{th}) 20/14UTC: 91.0W/21.2N
This indicates that between yesterday and today the forecast location is farther west and north. The wave phase speed is about 8-10 deg./day. Although very weak intensification is possible when emerging over the Gulf, genesis is not expected (**8**). The consensus forecast location for PGI-27L is as follows: 20/1200UTC: 87.4W/20.1N; 20/1400UTC: 91.0W/21.1N; 21/0200UTC: 94.2W/22.2N; 21/1400UTC: 97.0W/24.0N (landfall). The consensus is for the wave/pouch to be over the Gulf between 1200UTC on 20 Aug. and 1200UTC on 21 Aug. A DC-8 mission into PGI-27L on Friday has been canceled with an early Saturday morning mission possible for the emergence into the Gulf; however, temporal consistency cannot be maintained given its likely landfall around 1200UTC Saturday.

PGI-32L

PGI-32L is no longer being tracked; however, a distinct circulation is centered near 61W/19N (**2A, 2B**). This circulation is associated with a strong upper-level cold low (**3B**). Deep convection was initiated in all areas surrounding the upper-low overnight, but has been dissipating to the south while northern convection has persisted. While the environment near the center has been moistened, there is mid- to upper-level subsidence drying to the south (water vapor imagery). This stream of dry air has not been ingested into the center. The track of the upper cold low is for westward movement with the following GFS indicated forecast locations: 20/0600UTC: 60W/25N; 21/0600UTC: 70W/28N; 22/0600UTC: 75W/25N; 23/0600UTC: 78W/27N; 24/0600UTC: 80W/25N (over Florida). While convective organization has drastically improved over the last few days, the cold low very much has a challenge ahead to become warm core.

PGI-30L

The analyzed pouch position as of 8/19 0000 UTC was 19N/32W **(4)**. An isolated region of 850 hPa vorticity in the CIMSS analysis broke off from the ITCZ on 8/16 and has moved northwestward. The northward track of PGI30L has placed it in an environment of dry air and large-scale subsidence which has suppressed convection over the last 60 hr. The 0000 UTC ECMWF propagates the disturbance westwards over the next 5 days with the vorticity associated with the disturbance becoming increasingly deformed and filamented as it is overwhelmed by the developing PGI-31L. The pouch identification was ambiguous at several of the forecast times over this period according to the pouch tracking products. The GFS and UKMET quickly drop the disturbance after 48 h.

PGI-31L

There is currently a broad envelope of enhanced 850 hPa vorticity in the CIMMS analysis which extends from 25W-20W at 12N (**3C**). The maximum vorticity values associated with this disturbance has increased from 5 x 10^{-5} s^{-1} to 7x10^{-5} s^{-1} and become more concentrated over the last 24 hr. In addition, convection has increased with several cloud clusters in a broad envelope surrounding the disturbance **(9)**. The 1015 UTC ASCAT pass shows strong cyclonic curvature of the surface winds on the southern flank of the disturbance with 25 kts of SW flow in the SE sector of the pouch **(10)**. Shear over the identified pouch location is approximately 10 kts with strong upper-level divergence and NE flow in the upper-level satellite derived wind on the southern flank of the broad region of enhanced convection. The 0000 UTC ECMWF and GFS 0000 UTC and 0600 UTC organized this disturbance with the 0600 UTC GFS forming a tropical depression in the 8/20 1200 UTC to 8/21 0000 UTC timeframe. Between 8/20 0600 UTC and 8/21 0600 UTC a 200 hPa anticyclone is forecast by the 0600 UTC GFS to build over the disturbance providing favorable upper-level outflow; also during this time pouch relative vertical shear is forecast to remain near approximately 10 kts (**11**). The 0600 UTC GFS develops a tropical cyclone which will reach 50W at 8/24 1200 UTC. Since the center is still poorly defined with convection occurring over a broad area **(9)** the next 24 hr should allow for a better determination of the evolution of this system.

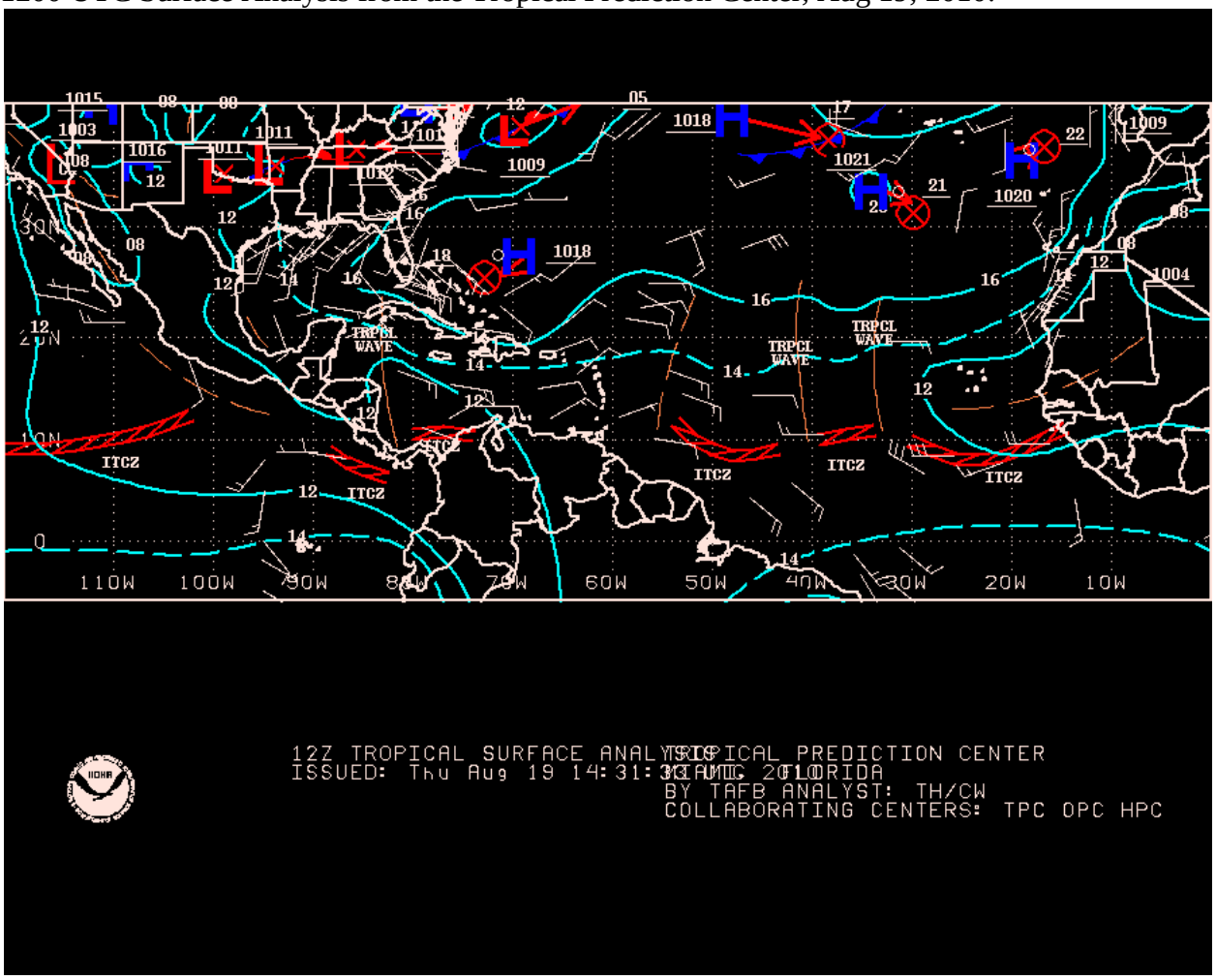
PGI-33L

The 8/19 0000 UTC consensus position of PGI33L is 9N/11W **(12)**; this disturbance is still fairly early in its development and there is still considerable disagreement in the analyses regarding the 8/19 0000 UTC position of the pouch between the GFS (10N/9W), UKMET (13N/15W), and

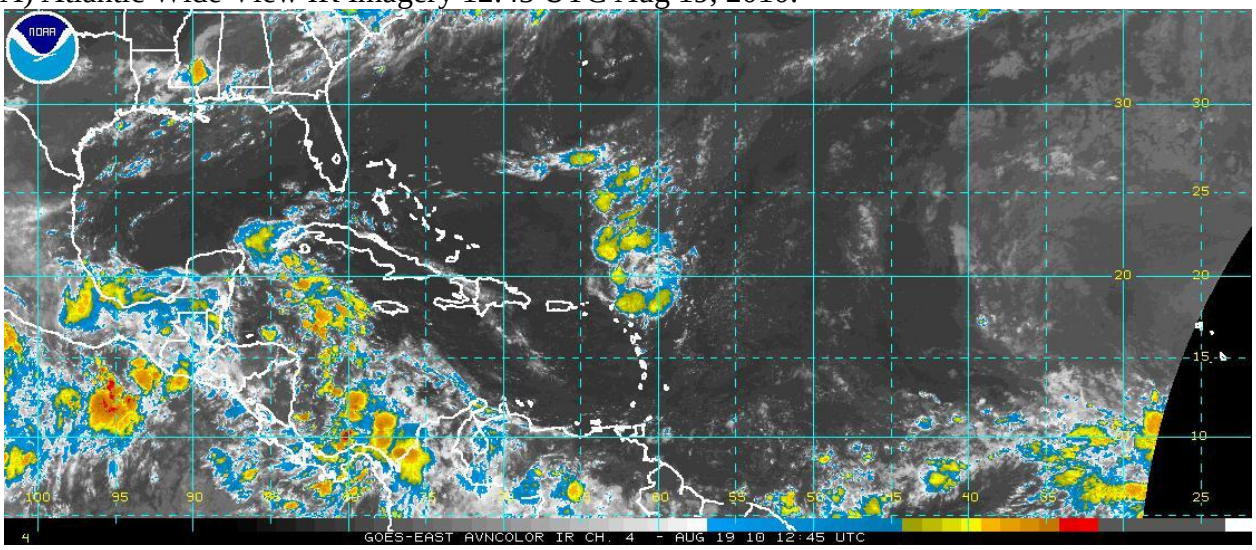
ECMWF (13N/17.5W) analyses. The system only recently developed following a large MCS which moved over Africa 36 hr ago. The 0000 UTC ECWMF forecasts PGI33L to merge with PGI33L and this combined system to develop into a tropical cyclone. The UKMET which has a much stronger analyzed 700 hPa vorticity maxima associated with PGI33L resulting in it overwhelming PGI31L by 8/22 0000 UTC. The 0000 and 0600 UTC GFS have PGI33L moving off of Africa and remaining coherent up to 8/21 1200 UTC when it becomes overwhelmed by the developing PGI31L. However, less confidence is given to the UKMET solution since the 0000 UTC run had PGI33L of comparable or greater intensity than PGI31L by 12h which is in disagreement with the current satellite observations of 850 hPa vorticity (**11, 12**). Monitoring over the next 24 hr will allow for a more precise determination of the position of PGI33L and whether it will simply be incorporated into or overwhelmed by PGI31L.

Static Images used in discussion:

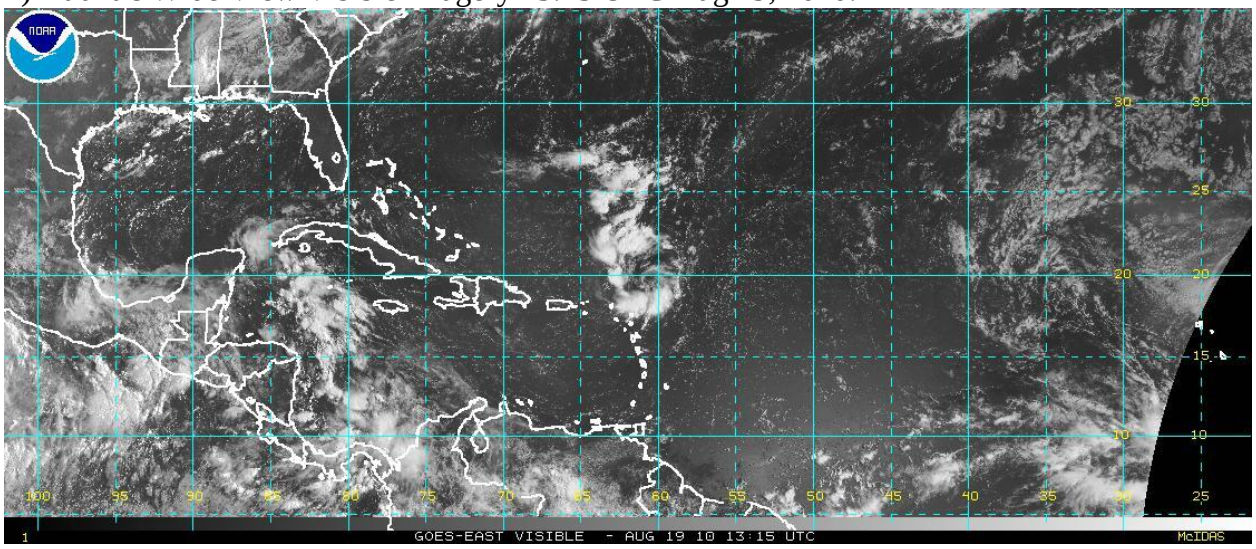
1) 1200 UTC Surface Analysis from the Tropical Prediction Center, Aug 19, 2010:



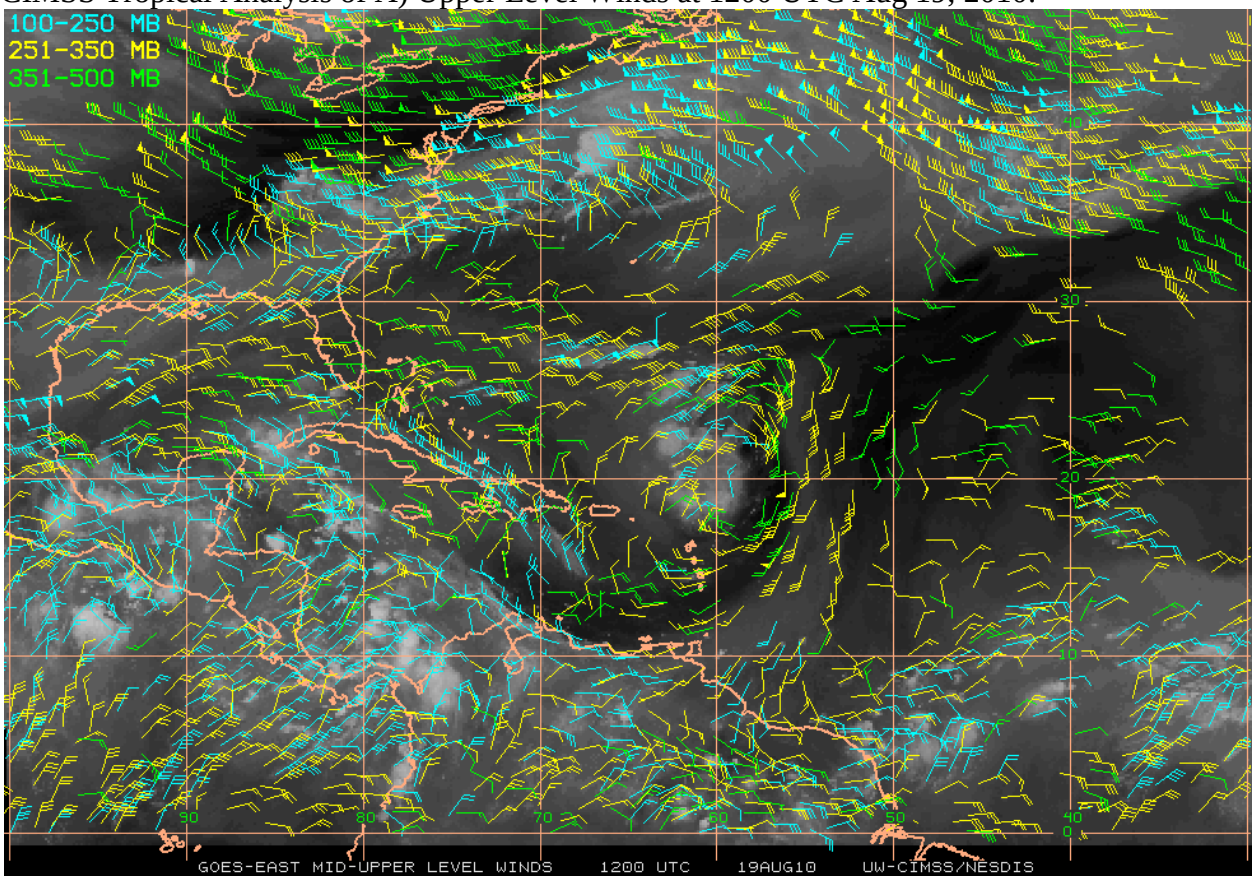
2) A) Atlantic Wide View IR Imagery 12:45 UTC Aug 19, 2010:



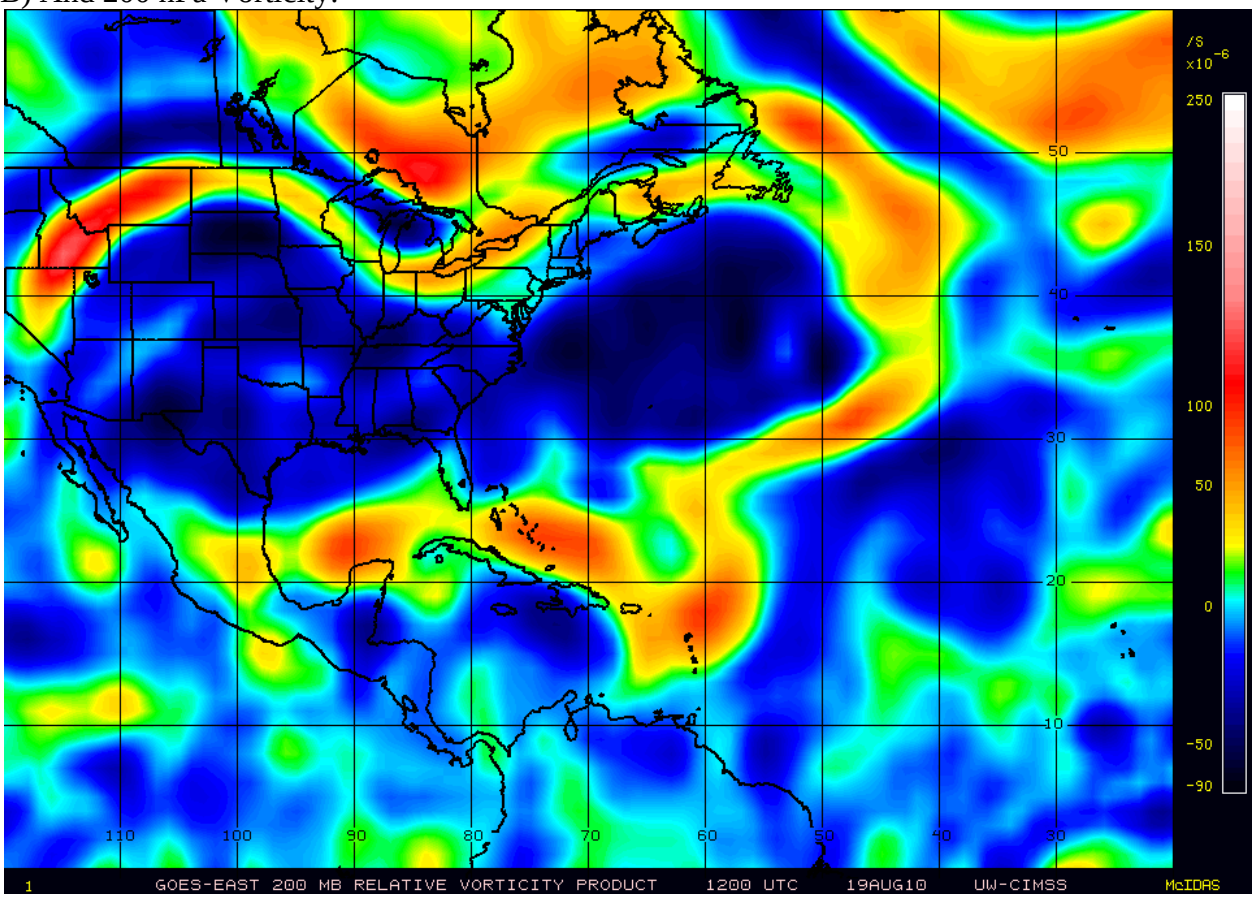
B) Atlantic Wide View Visible Imagery 13:15 UTC Aug 19, 2010:



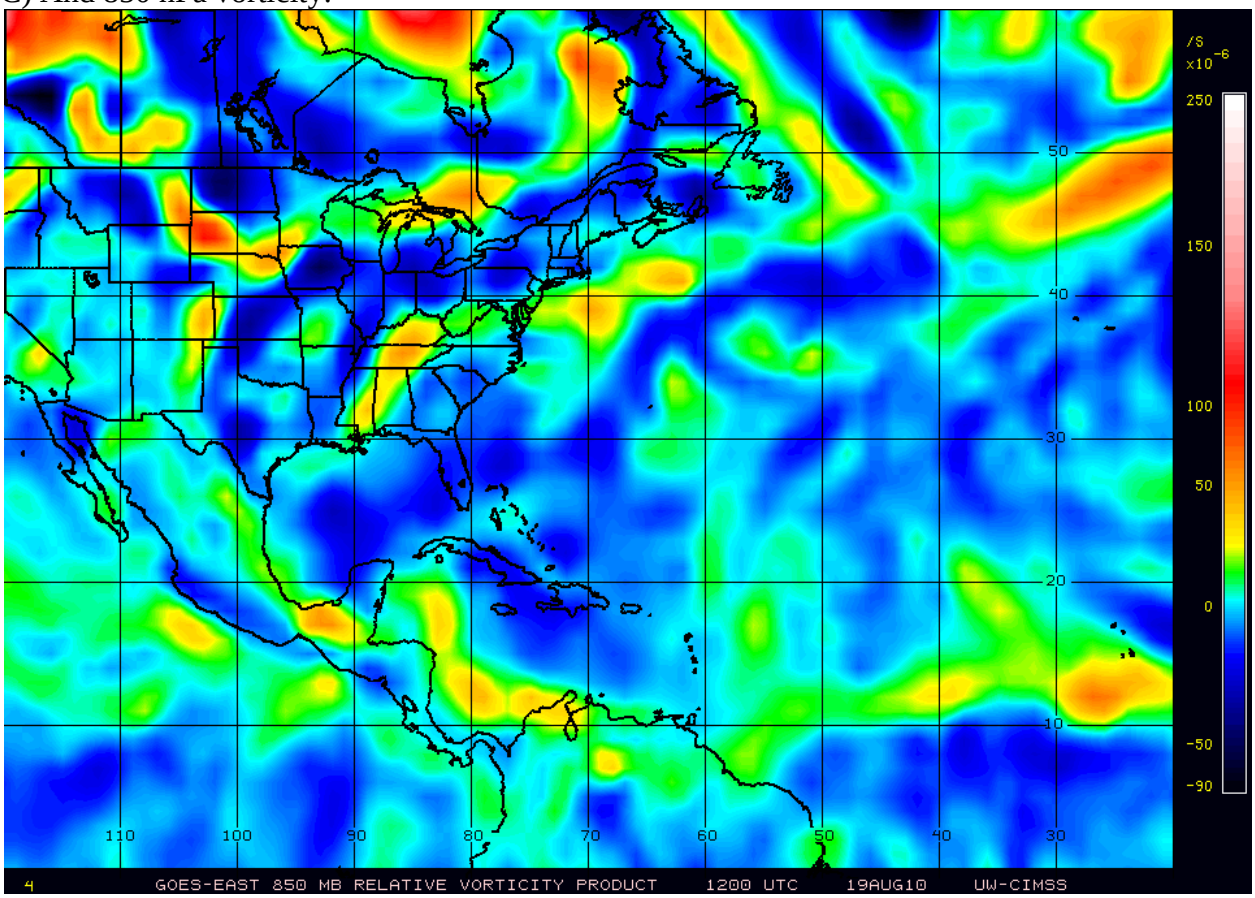
3) CIMSS Tropical Analysis of A) Upper Level Winds at 1200 UTC Aug 19, 2010:



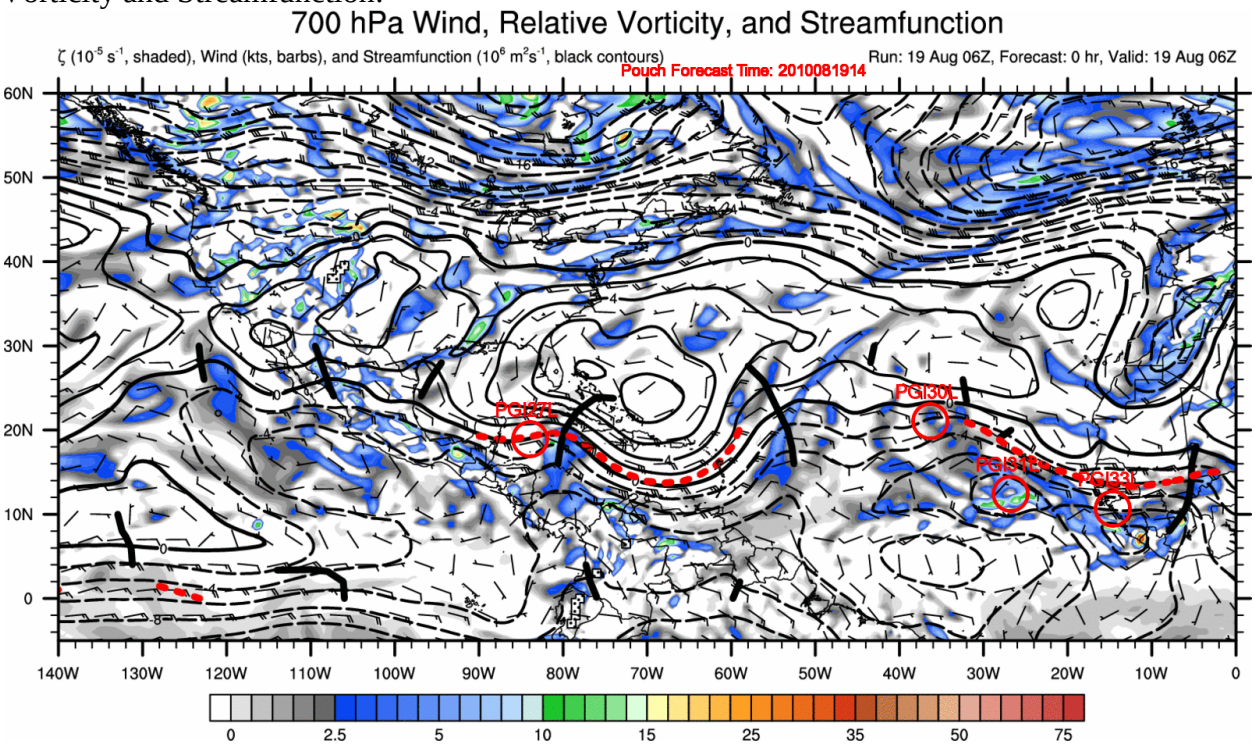
B) And 200 hPa Vorticity:



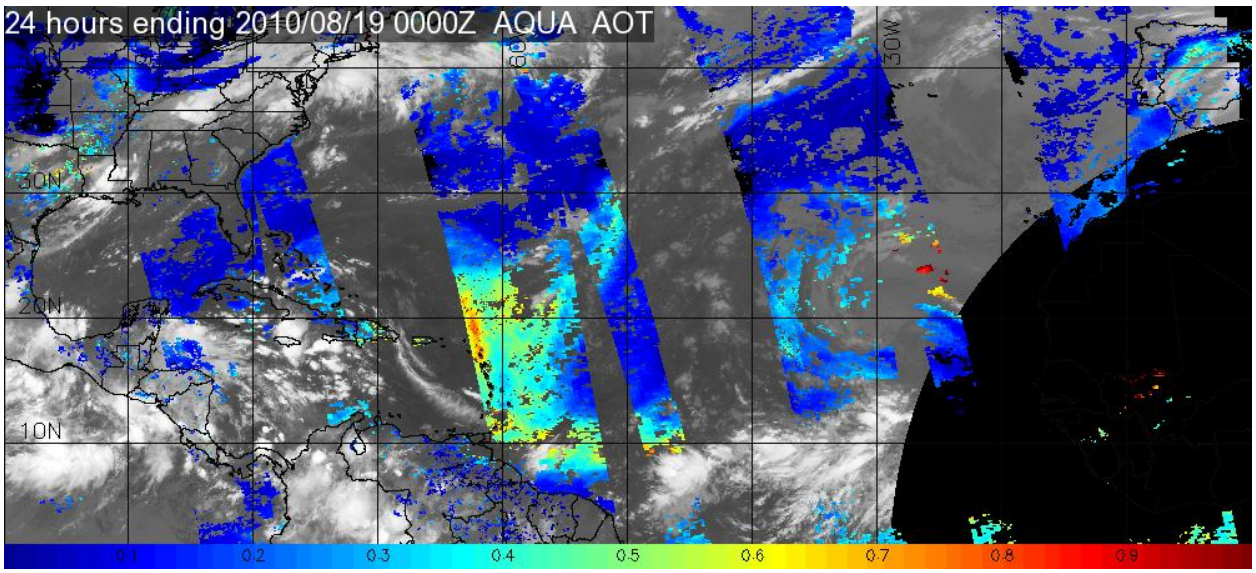
C) And 850 hPa vorticity:



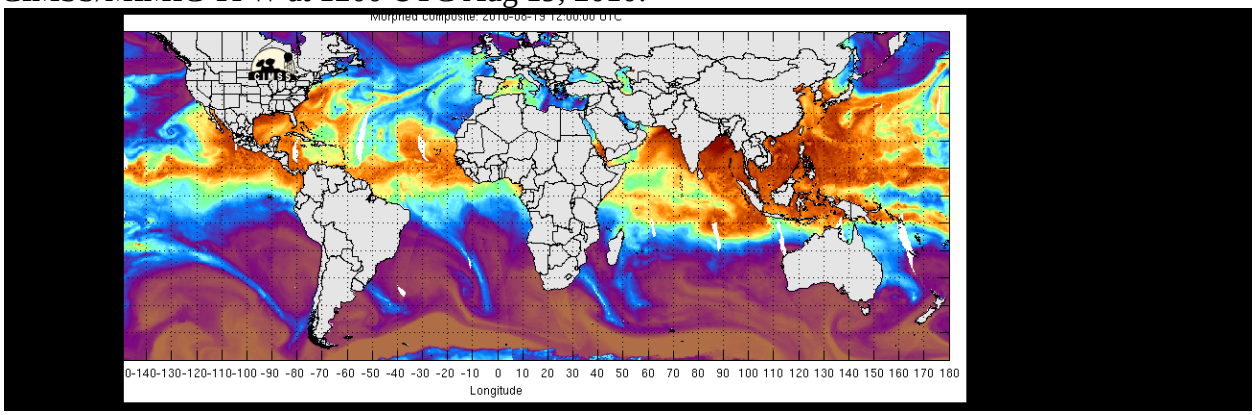
4) Pouches from Montgomery site for Aug 19, 20 plotted on 700 hPa Winds, Relative Vorticity and Streamfunction:



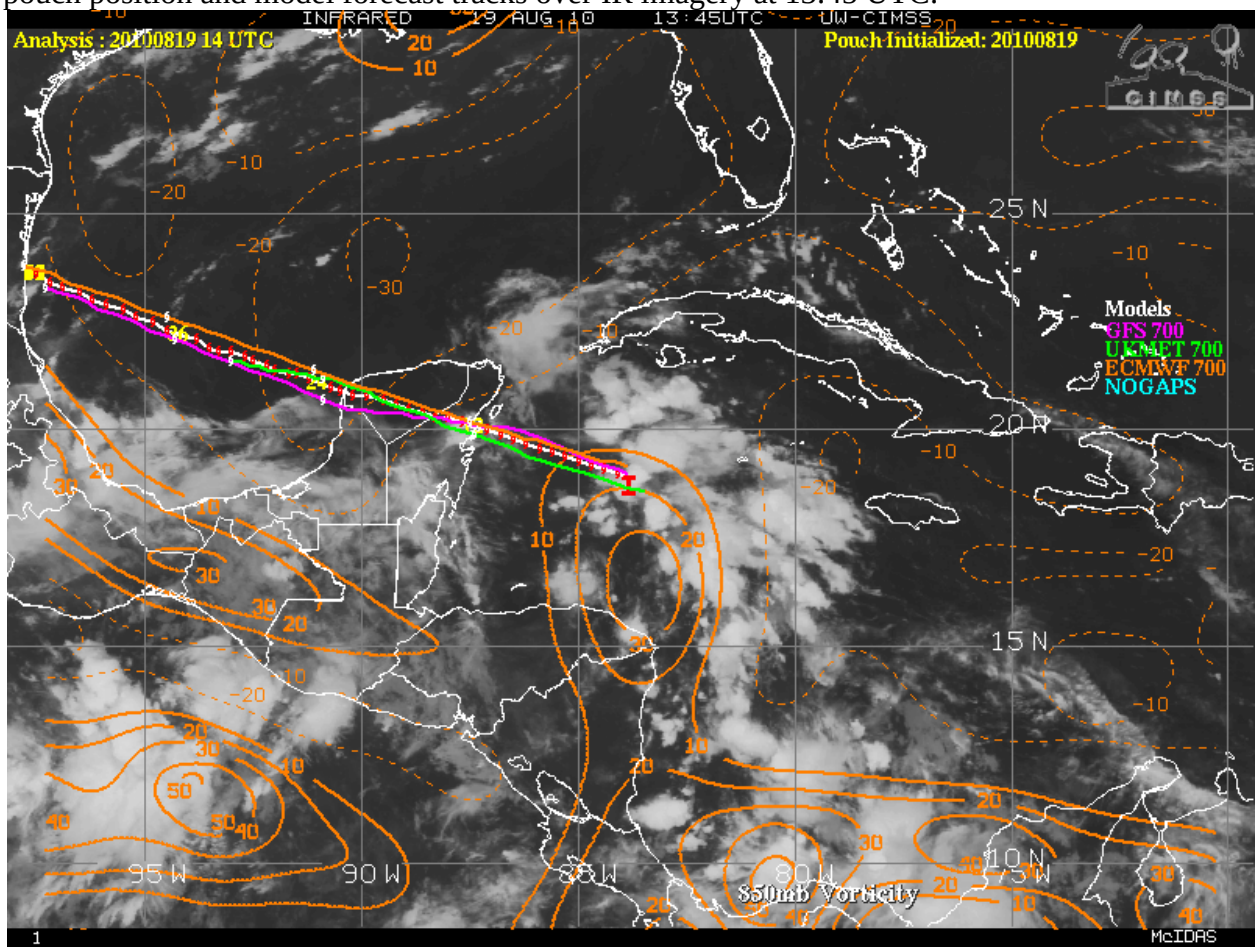
5) AQUA Aerosol Optical Thickness 24-hour composite plot from Aug 19, 2010 at 0000 UTC:



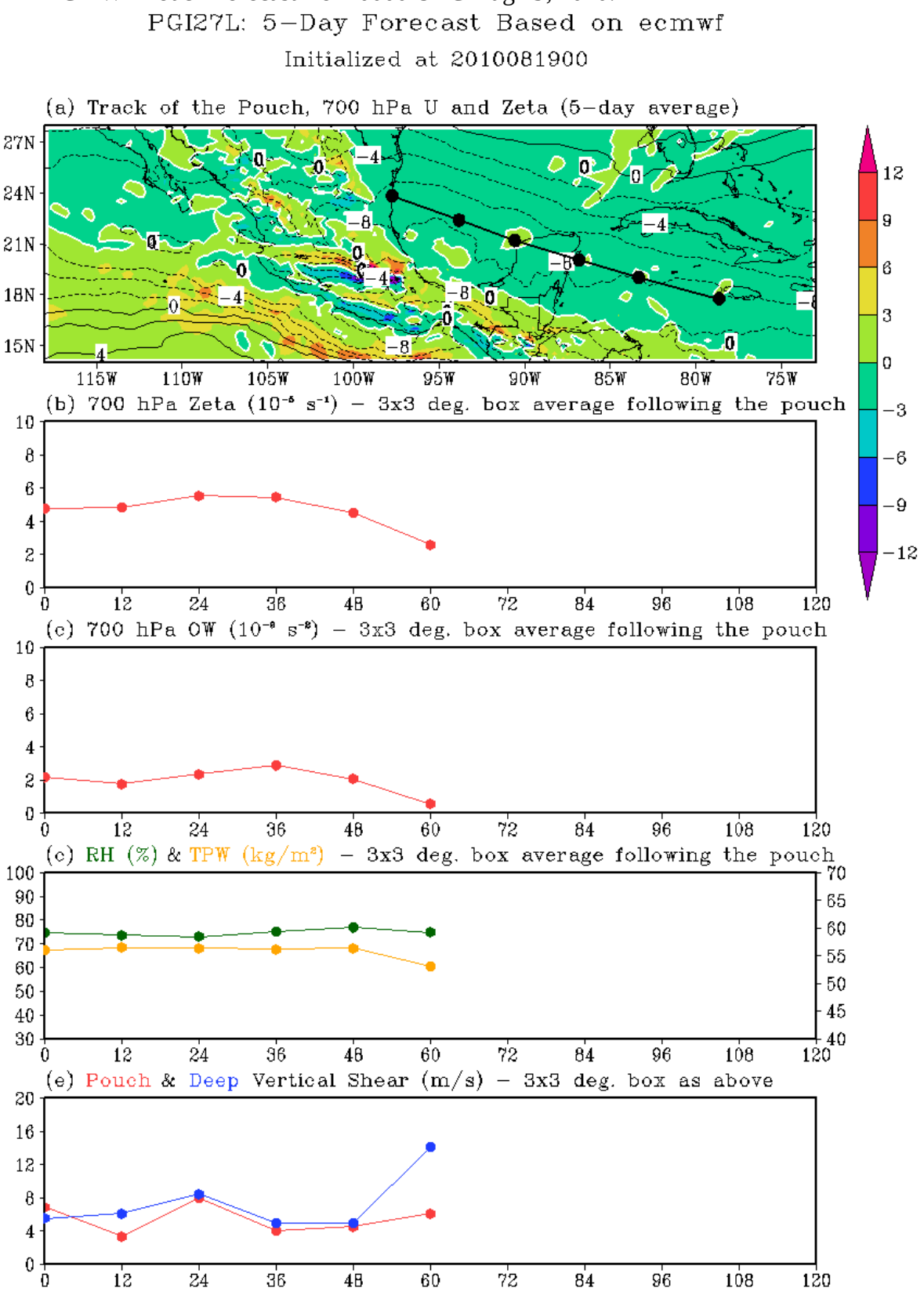
6) CIMSS/MIMIC TPW at 1200 UTC Aug 19, 2010:



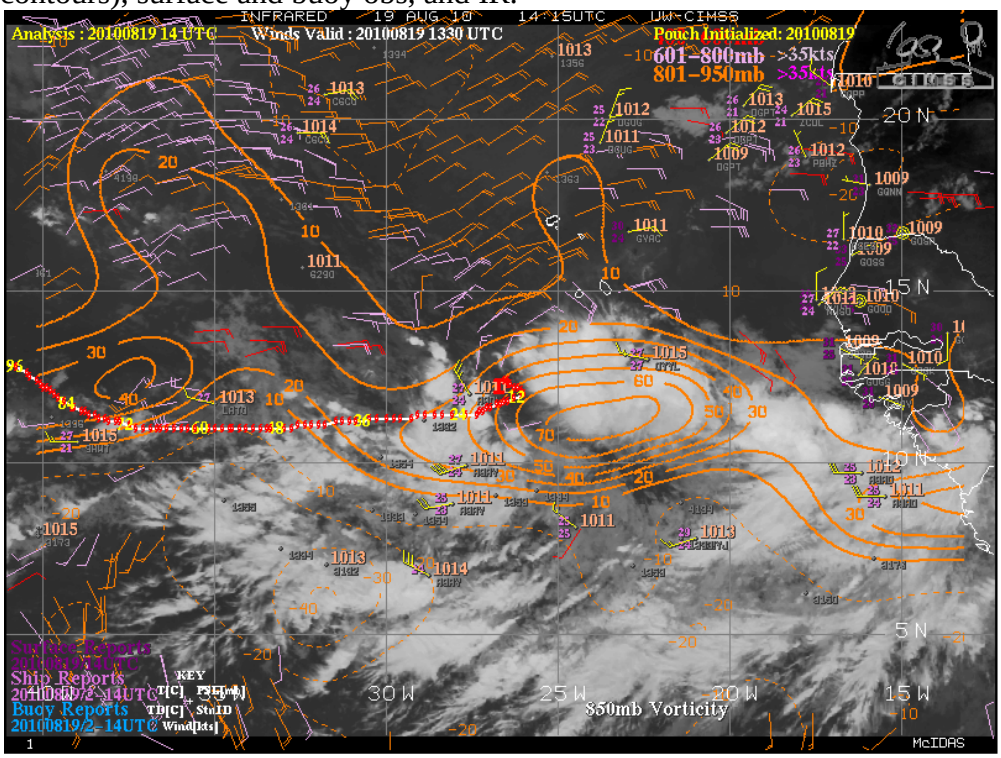
7) PGI-27L CIMSS multiproduct from Aug 19, 2010 showing 850 hPa vorticity 0000 UTC pouch position and model forecast tracks over IR imagery at 13:45 UTC:



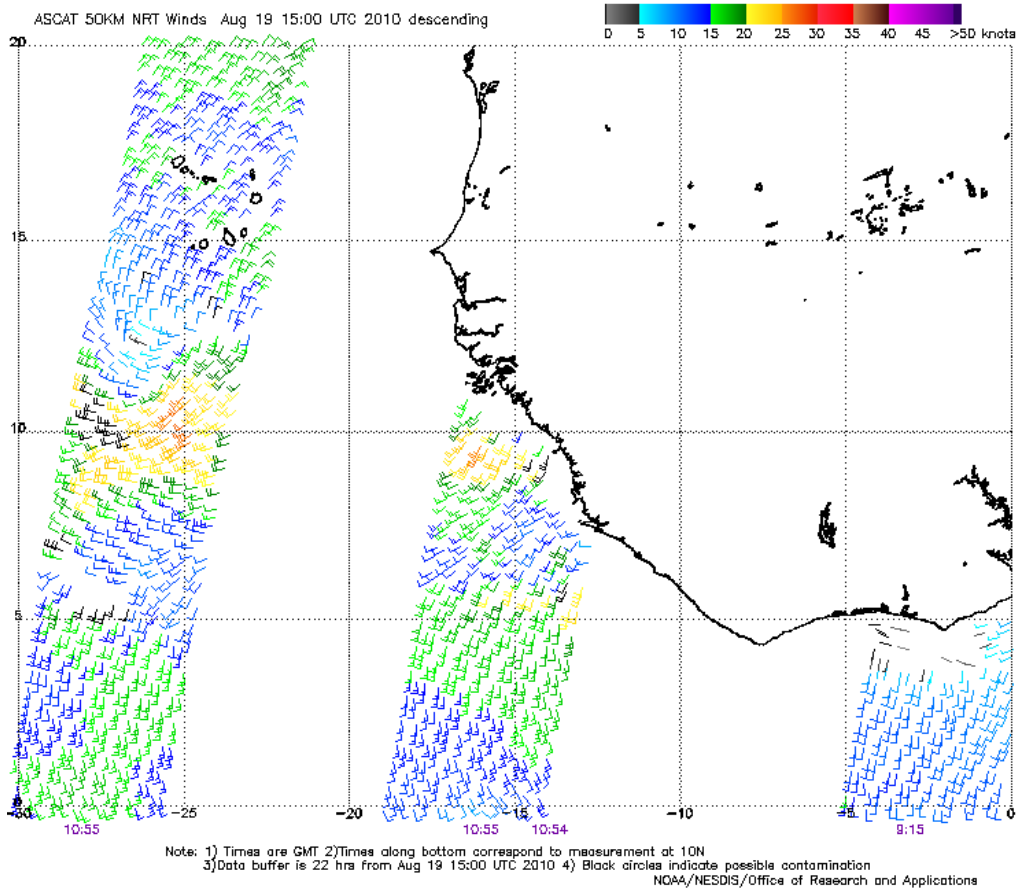
8) PGI-27L ECMWF Pouch Forecast from 0000 UTC Aug 19, 2010:



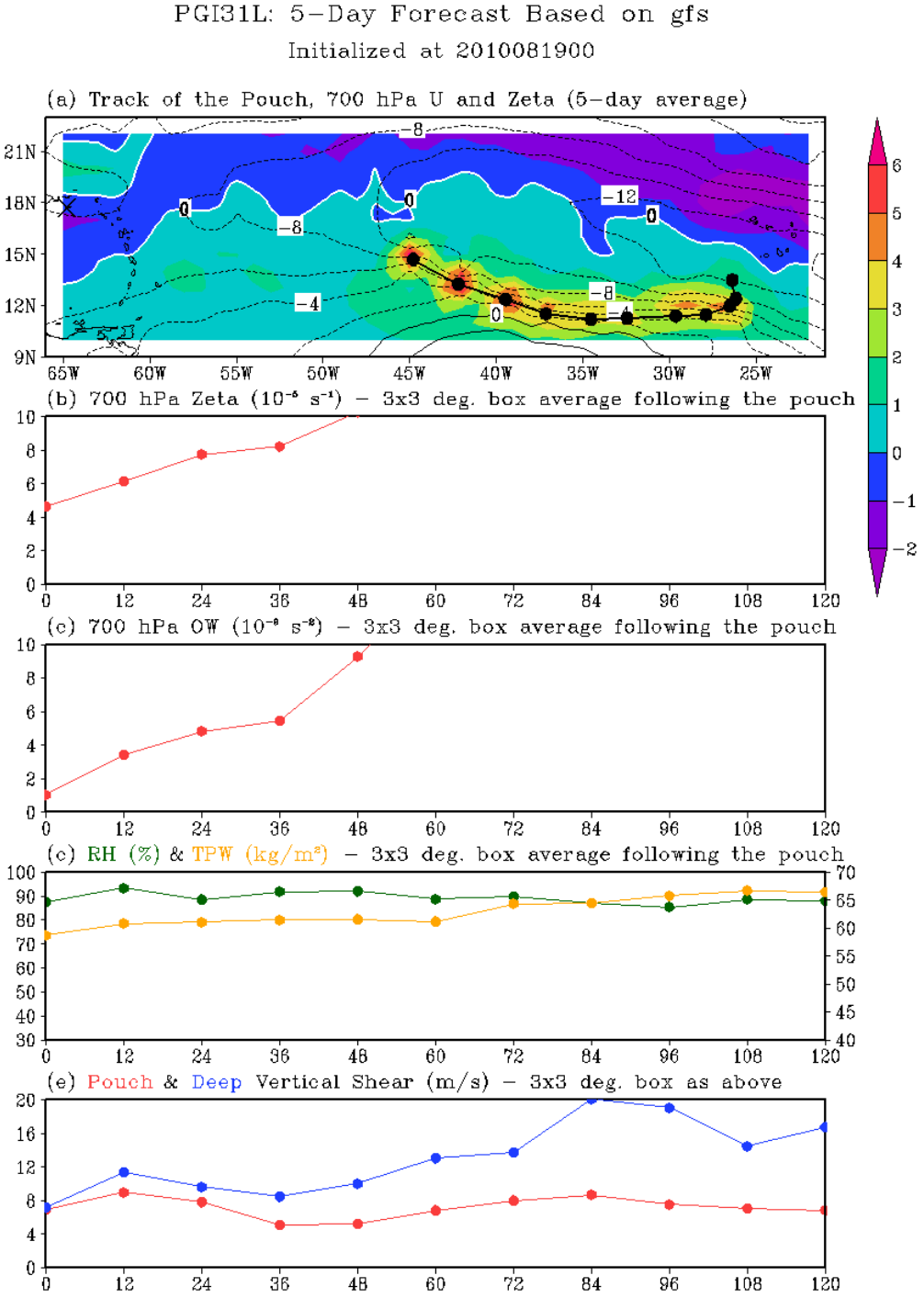
9) PGI31L 8/19 1500 UTC CIMSS analysis of 850 hPa vorticity ($x10^{-5}$ s^{-1}, orange contours), surface and buoy obs, and IR.



10) ASCAT Pass at 10:55 UTC Aug 19 showing the developing circulation associated with the PGI-31L pouch.



11) Pouch analysis of PGI31L initialized from the 8/19 0000 UTC GFS.



12) PGI33L 8/19 1500 UTC CIMSS analysis of 850 hPa vorticity ($x10^{-5}$ s^{-1}, orange contours), surface and bouy stations, and IR.